IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
MARSHALL DIVISION

COMMONWEALTH SCIENTIFIC INDUSTRIAL RESEARCH ORGANIZATION,	§	
	§	**CASE NO. 2:05-CV-53**
Plaintiff,	§	**PATENT CASE**
vs.	§	
BUFFALO TECHNOLOGY (USA), INC. and BUFFALO INC.,	§	
Defendant.	§	

MEMORANDUM OPINION

This claim construction opinion interprets disputed terms in United States Patent No. 5,487,069 ("the '069 Patent"). Having considered the parties' submissions and oral arguments, the Court construes the disputed terms as follows.[1]

BACKGROUND

Commonwealth Scientific and Industrial Research Organization ("CSIRO") filed this action on February 5, 2005 accusing Buffalo Technology (USA), Inc. and Buffalo Inc. (collectively "Buffalo") of infringing the '069 Patent. The '069 Patent relates to a wireless Local Area Network ("LAN") wherein a plurality of wireless transceivers communicate with a plurality of wireless hub transceivers. The '069 Patent provides a solution to transmitting data at a high rate and with high reliability using radio frequency signals within an indoor environment (*e.g.*, an office). The patent

[1] Appendix A to this Memorandum Opinion contains the relevant claims of the '069 Patent with the disputed terms indicated in boldface type. Appendix B contains the Court's Claim Construction Chart, which construes the disputed terms.

teaches a combination of three key techniques: parallel sub-channels (ensemble modulation) wherein the period of a sub-channel symbol is longer than a predetermined time delay of the non-direct transmission paths, data reliability enhancement with Forward Error Correction ("FEC"), and data reliability enhancement with bit interleaving. As of the conclusion of oral arguments on claim construction, the parties disputed the construction of eight claim terms.

APPLICABLE LAW

"It is a 'bedrock principle' of patent law that 'the claims of a patent define the invention to which the patentee is entitled the right to exclude.'" *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312 (Fed. Cir. 2005) (en banc) (quoting *Innova/Pure Water Inc. v. Safari Water Filtration Sys*., *Inc*., 381 F.3d 1111, 1115 (Fed. Cir. 2004)). In claim construction, courts examine the patent's intrinsic evidence to define the patented invention's scope. *Id*.; *C.R. Bard, Inc. v. U.S. Surgical Corp*., 338 F.3d 858, 861 (Fed. Cir. 2004); *Bell Atl. Network Servs*., *Inc. v. Covad Commc'ns Group*, *Inc*., 262 F.3d 1258, 1267 (Fed. Cir. 2001). This intrinsic evidence includes the claims themselves, the specification, and the prosecution history. *See Phillips*, 415 F.3d at 1314; *C.R. Bard*, 388 F.3d at 861. Courts give claim terms their ordinary and accustomed meaning as understood by one of ordinary skill in the art at the time of the invention in the context of the entire patent. *Phillips*, 415 F.3d at 1312-13; *Alloc*, *Inc. v. Int'l Trade Comm'n*, 342 F.3d 1361, 1368 (Fed. Cir. 2003) (en banc).

The claims themselves provide substantial guidance in determining the meaning of particular claim terms. *Phillips*, 415 F.3d at 1314. First, a term's context in the asserted claim can be very instructive. *Id*. Other asserted or unasserted claims can also aid in determining the claim's meaning because claim terms are typically used consistently throughout the patent. *Id*. Differences among the claim terms can also assist in understanding a term's meaning. *Id*. For example, when a

dependent claims adds a limitation to an independent claim, courts presume that the independent claim does not include the limitation. *Id*. at 1314-15.

Claims "must be read in view of the specification, of which they are a part." *Id*. at 1315 (quoting *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 979 (Fed. Cir. 1995) (en banc)). "[T]he specification 'is always highly relevant to the claim construction analysis. Usually, it is dispositive; it is the single best guide to the meaning of a disputed term.'" *Id*. (quoting *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996)); *Teleflex*, *Inc. v. Ficosa N. Am. Corp.*, 299 F.3d 1313, 1325 (Fed. Cir. 2002) (en banc). This is because a patentee may define his own terms, give a claim term a different meaning that the term would otherwise possess, or disclaim or disavow the claim scope. *Phillips*, 415 F.3d at 1316. In these situations, the inventor's lexicography governs. *Id*. The specification also may resolve ambiguous claim terms "where the ordinary and accustomed meaning of the words used in the claims lack sufficient clarity to permit the scope of the claim to be ascertained from the words alone." *Teleflex*, 299 F.3d at 1325. But, "[a]lthough the specification may aid the court in interpreting the meaning of disputed claim language, particular embodiments and examples appearing in the specification will not generally be read into the claims." *Comark Commc'ns*, *Inc. v. Harris Corp.*, 156 F.3d 1182, 1187 (Fed. Cir. 1998) (quoting *Constant v. Advanced Micro-Devices*, *Inc.*, 848 F.2d 1560, 1571 (Fed. Cir. 1988)); *see Phillips*, 415 F.3d at 1323. The prosecution history is another tool to supply the proper context for claim construction because a patent applicant may also define a term in prosecuting the patent. *Home Diagnostics, Inc., v. Lifescan, Inc.*, 381 F.3d 1352, 1356 (Fed. Cir. 2004) (en banc) ("As in the case of the specification, a patent applicant may define a term in prosecuting a patent."). Like

the specification, the prosecution history provides evidence of how the patent examiner and the inventor understood the patent. *Phillips*, 415 F.3d at 1317.

Although extrinsic evidence can be useful, it is "'less significant than the intrinsic record in determining the legally operative meaning of claim language.'" *Id.* (quoting *C.R. Bard*, 388 F.3d at 862). Technical dictionaries and treatises may help a court understand the underlying technology and the manner in which one skilled in the art might use claim terms, but technical dictionaries and treatises may provide definitions that are too broad or may not be indicative of how the term is used in the patent. *See id*. at 1318. Similarly, expert testimony may aid a court in understanding the underlying technology and determining the particular meaning of a term in the pertinent field, but an expert's conclusory, unsupported assertions as to a term's definition are entirely unhelpful to a court. *Id*. Generally, extrinsic evidence is "less reliable than the patent and its prosecution history in determining how to read claim terms." *Id*.

The '069 Patent also contains "means-plus-function" limitations that require construction. When a claim limitation is expressed in means-plus-function language and does not recite definite structure in support of its function, the limitation is subject to 35 U.S.C. § 112, ¶ 6. *Braun Med*., *Inc*. *v*. *Abbott Labs*., 124 F.3d 1419, 1424 (Fed. Cir. 1997). In relevant part, 35 U.S.C. § 112, ¶ 6 mandates that "such a claim limitation 'be construed to cover the corresponding structure . . . described in the specification and equivalents thereof.'" *Id*. (citing 35 U.S.C. § 112, ¶ 6). Accordingly, when faced with means-plus-function limitations, courts "must turn to the written description of the patent to find the structure that corresponds to the means recited in the [limitations]." *Id*.

Construing a means-plus-function limitation involves multiple inquiries. "The first step in construing [a means-plus-function] limitation is a determination of the function of the means-plus-function limitation." *Medtronic, Inc. v. Advanced Cardiovascular Sys., Inc.*, 248 F.3d 1303, 1311 (Fed. Cir. 2001). The Court may not construe a means-plus-function limitation by "adopting a function different from that explicitly recited in the claim." *Micro Chem., Inc. v. Great Plains Chem. Co.*, 194 F.3d 1250, 1258 (Fed. Cir. 1999). Once a court has determined the limitation's function, "the next step is to determine the corresponding structure disclosed in the specification and equivalents thereof." *Medtronic*, 248 F.3d at 1311. A "structure disclosed in the specification is 'corresponding' structure only if the specification or prosecution history clearly links or associates that structure to the function recited in the claim." *Id.* Moreover, the focus of the "corresponding structure" inquiry is not merely whether a structure is capable of performing the recited function, but rather whether the corresponding structure is "clearly linked or associated with the [recited] function." *Id.*

CONSTRUCTION OF DISPUTED TERMS IN THE '069 PATENT

"Confined multipath [transmission] environment"

The Court adopts CSIRO's proposed construction and construes the term "confined multipath [transmission] environment" to mean "an indoor environment." Buffalo argues that the Court should interpret the term more expansively to mean "a defined environment with boundaries wherein direct and/or reflected paths may be taken by radio frequency signals from a transmitter to a receiver." Though Buffalo does not dispute that "indoor environment" is consistent with the plain meaning of the claim language and concedes that the specification contains references to such an environment, Buffalo contends that neither the claim language, the specification, nor the file history limit the

term's construction to only an indoor environment. CSIRO argues that its proposed construction comes from the claims' plain meaning as well as their context in light of the specification and prosecution history, whereas Buffalo's construction is ambiguous and baseless.

Although on its face the term "confined" does not seem limited to an indoor area, that term clearly refers to an area with fixed boundaries—an attribute that Buffalo's proposed construction does not adequately capture. "Confined" and "defined" are hardly synonymous, and Buffalo's inclusion of the term "boundaries" in its construction conceivably includes anything that reflects radio waves creating an indirect transmission path—even a meteor trail or satellite. Without further narrowing of its proposed "defined environment," Buffalo's construction of "confined multipath environment" is too broad to permit one of ordinary skill in the art to understand the term's meaning.

The specification describes the specific multipath signal problem that the invention was designed to address. The specification notes how the invention was designed to ameliorate problems that occur more acutely in a wireless LAN multipath "office or indoor environment" and "typical rooms" than with telephone or long distance radio communications. '069 Patent, cols. 4:58-59, 5:3-15, 8:38-40. Buffalo contends that reliance on this language improperly reads an extraneous limitation from the specification into the claims, but the specification language simply defines an existing limitation and deriving interpretive guidance from such language is proper. *See Phillips*, 415 F.3d at 1317 ("It is . . . entirely appropriate for a court, when conducting claim construction, to rely heavily on the written description for guidance as to the meaning of claims").

The prosecution history also shows that the patentees linked "confined multipath environment" to an indoor environment. After the patent examiner rejected the patentees' original claims filed with their 1993 application as obvious in light of the prior art, the patentees amended

their claims and distinguished the prior art as being designed to operate over long distances instead of within "a room of an office building or the like, unlike the present invention." July 1995 Amendment to U.S. Patent Application 157,375, at 26. The prior art did not "appear[] to describe radio transmissions 'in a confined multipath environment.'" *Id*. at 27. The prosecution history thus links "confined multipath environment" with an indoor environment.

Accordingly, the Court construes "confined multipath environment" to mean "an indoor environment."

"Radio frequencies"

The Court adopts CSIRO's proposed construction and construes the term "radio frequencies" to mean "the frequencies in the portion of the electromagnetic spectrum that is between the audio-frequency portion and the infrared portion." Buffalo urges the Court to construe "radio frequencies" to mean "frequencies, in excess of 10 GHz but still within the electromagnetic spectrum normally associated with radio signal propagation, *i.e.*, less than or equal to 300 GHz," and argues that the doctrine of prosecution history estoppel prevents CSIRO from asserting its preferred construction.

The claim terms' context supports CSIRO's construction. Reading the term "radio frequencies" in both the asserted and unasserted claims, one of ordinary skill in the art would interpret that term to connote all frequencies in the radio portion of the electromagnetic spectrum. Construing "radio frequencies" to mean a range between 10 and 300 GHz would contradict the term's ordinary meaning[2] and render numerous claims substantively identical in scope. The doctrine of claim differentiation makes Buffalo's construction presumptively unreasonable because under the

[2] The parties do not dispute that the ordinary meaning of "radio frequencies" connotes a range of 3 KHz (three thousand cycles per second) to 300 GHz (three hundred billion cycles per second).

doctrine each claim in a patent is presumed to have a different scope. *Comark*, 156 F.3d at 1187; *Beachcomber v. Wildewood Creative Prods*., *Inc.*, 331 F.2d 1154, 1162 (Fed. Cir. 1994). The specification explicitly identifies different embodiments of the invention, some of which operate at "radio frequencies" and others that operate "in excess of 10 GHz."

Buffalo concedes these points but argues the patentees disavowed CSIRO's construction of "radio frequencies" during prosecution and therefore the doctrine of prosecution history estoppel renders Buffalo's construction the only legitimate one. Accordingly, argues Buffalo, the doctrine of claim differentiation permits adopting that construction.

Specifically, Buffalo argues that although certain claims in the '069 Patent mention an invention transmitting at frequencies exceeding 10 GHz and other claims mention an invention transmitting simply at "radio frequencies," the patentees' 1992 Australian patent application and 1993 U.S. patent application mentioned only an invention transmitting at frequencies exceeding 10 GHz. Buffalo argues that the patentees never intended to patent an invention that transmitted at frequencies less than 10 GHz and that the patentees replaced certain references to the 10 GHz limitation with the less restrictive "radio frequencies" only when they realized Institute of Electrical and Electronics Engineers standards for wireless LANs would likely permit operation at frequencies less than 10 GHz. Buffalo contends that this replacement introduces "new matter" into disclosure of the invention, which 35 U.S.C. § 112 prohibits. Therefore the claims must be limited to the scope of the embodiments describing transmission above 10 GHz.

The claim differentiation doctrine's presumption is rebutted if the claims will bear only an interpretation that makes them identical. *Autogiro Co. of Am. v. United States*, 384 F.2d 391, 404 (Ct. Cl. 1967); *see also Multiform Desiccants*, *Inc. v. Medzam*, *Ltd.*, 133 F.3d 1473, 1480 (Fed. Cir.

1998) ("[T]he doctrine of claim differentiation can not broaden claims beyond their correct scope, determined in light of the specification and the prosecution history and any relevant extrinsic evidence."). However, Buffalo errs when it contends that the law makes its construction of "radio frequencies" the only permissible interpretation. Buffalo cites *Schering Corp. v. Amgen*, *Inc.*, 222 F.3d 1347, 1352 (Fed. Cir. 2000), to support its argument regarding new matter, but the Federal Circuit in *Schering* imposed limitations on a term based on the patentee's explicit disavowals during prosecution, not because the patentee improperly introduced new matter. *See Affymetrix v. Hyseq*, *Inc.*, 132 F. Supp. 2d 1212, 1219 (N.D. Cal. 2001); *Reiffin v. Microsoft*, 64 U.S.P.Q.2d (BNA) 1107, 1112 (N.D. Cal. 2002). Determining whether the patentee introduced new matter during prosecution is not appropriate during claim construction. *See*, *e.g.*, *Pliant Corp. v. MSC Mktg. & Tech.*, *Inc.*, 416 F. Supp. 2d 632, 643 n.5 (N.D. Ill. 2006) (finding that the issue of new matter "is not a matter for claim construction"); *Reiffin*, 64 U.S.P.Q.2d (BNA) at 1112 ("Courts do not [determine] whether a patent contains new matter at the claim construction stage.").

Buffalo likewise misapprehends the law of prosecution history estoppel. Prosecution history estoppel normally arises when a patentee narrows the patent's scope through amendment to avoid prior art. *See Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co.*, 535 U.S. 722, 735-36 (2002) ("*Festo II*"). This precludes the patentee from recapturing subject matter through the doctrine of equivalents that the amendment relinquished. *See id.* at 733-34; *Wang Labs*., *Inc. v. Mitsubishi Elecs. Am.*, *Inc*., 103 F.3d 1571, 1577-78 (Fed. Cir. 1997) (holding that prosecution history estoppel "preclud[es] a patentee from regaining, through litigation, coverage of subject matter relinquished during prosecution of the application for the patent"). Prosecution history estoppel helps ensure that the doctrine of equivalents is used only to protect subject matter not affirmatively surrendered. *See*

Festo II, 535 U.S. at 734-35. Though the Supreme Court has held that amendments for purposes other than avoiding prior art may still give rise to estoppel, only a *narrowing* amendment gives rise to estoppel. *See id*. at 735-36 ("Estoppel arises when an amendment is made to secure the patent and the amendment narrows the patent's scope."); *see also Bus. Objects*, *S.A. v. Microstrategy*, *Inc.*, 393 F.3d 1366, 1375 (Fed Cir. 2005); *Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co.*, 344 F.3d 1359, 1366 (Fed. Cir. 2003) ("*Festo III*") (holding that "[i]f the amendment was not narrowing, then prosecution history estoppel does not apply"). In this case, the portions of the 1995 amendment at issue replaced certain references to "in excess of 10 GHz" with "radio frequencies." There is no dispute that these were broadening amendments. Prosecution history estoppel thus cannot apply.

Finally, Buffalo points to nothing in the specification or prosecution history that reflects the patentees' clear and express disavowal of multipath propagation at frequencies below 10 GHz. An express disavowal is the only kind that the law will recognize as effective. *See Omega Eng'g, Inc. v. Raytek Corp*., 334 F.3d 1314, 1324-25 (Fed. Cir. 2003) (disavowal of claim scope in prosecution history must be unequivocal); *see also SciMed Life Sys*., *Inc. v. Advanced Cardiovascular Sys.*, *Inc.*, 242 F.3d 1337, 1341 (Fed Cir. 2001) ("Where the specification makes clear that the invention does not include a particular feature, that feature is deemed to be outside the reach of the [patent's] claims . . . ."); *Cutlor Corp. v. A.E. Staley Mfg. Co.*, 224 F.3d 1328, 1331 (Fed. Cir. 2000) ("Claims are not correctly construed to cover what was expressly disclaimed."). Indeed, Buffalo foregoes any argument that the patentees disavowed multipath frequencies below 10 GHz entirely and relies solely on its prohibited new matter and prosecution history estoppel arguments, neither of which apply.

Therefore, the Court adopts CSIRO's construction and construes "radio frequencies" to mean "the frequencies in the portion of the electromagnetic spectrum that is between the audio-frequency portion and the infrared portion."

"Antenna means"

The Court adopts CSIRO's proposed construction and construes the term "antenna means" to mean "a means for radiating or receiving radio waves." Nothing in the claim language, the specification, or the prosecution history supports Buffalo's contention that the term's meaning should be limited to "a means for transmitting and/or receiving radio frequency signals whereby the antenna in the mobile transceiver is a steerable antenna." Buffalo argues that the specification's language referring to a "steerable antenna" supports its interpretation, but the language Buffalo cites unmistakably designates steerability of an antenna as a preferred embodiment: "antenna 37 is preferably a steerable antenna which is electronically steerable." '069 Patent, col. 6:12-16. A preferred embodiment usually does not restrict construction of a patent's claims. *See Nazomi Commc'ns*, *Inc. v. Arm Holdings, PLC*, 403 F.3d 1364, 1369 (Fed. Cir. 2005) (claims may embrace "different subject matter than is illustrated in the specific embodiments of the specification"); *see also Phillips*, 415 F.3d at 1323; *Teleflex*, 299 F.3d at 1327. *But see Modine Mfg. Co. v. U.S. Int'l Trade Comm'n*, 75 F.3d 1545, 1551 (Fed. Cir. 1996) (holding that "when the preferred embodiment is described . . . as the invention itself, the claims are not necessarily entitled to a broader scope than that embodiment"), *overruled on other grounds by Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co.*, 234 F.3d 558, 574 (Fed. Cir. 2000) (en banc) ("*Festo I*"). Buffalo tries to circumvent this clear principle of law by arguing that the relevant preference in the specification's text is distributed to the adverb "electronically" but somehow by-passes the adjective "steerable." This

construction is grammatically untenable, and a claim must be read in accordance with the precepts of English grammar. *In re Hyatt*, 708 F.2d 712, 714 (Fed. Cir. 1983).

Therefore, the Court construes "antenna means" as "a means for radiating or receiving radio waves."

"Modulation means for modulating input data of said input data channel into a plurality of sub-channels comprised of a sequence of data symbols such that the period of a sub-channel symbol is longer than a predetermined period representative of the time delay of significant ones of non-direct transmission paths"

The parties agree that the Court should construe this term as a means-plus-function limitation under 35 U.S.C. § 112, ¶ 6. The Court agrees with CSIRO that the claimed function is "modulating input data of said input data channel into a plurality of sub-channels comprised of a sequence of data symbols such that the period of a sub-channel symbol is longer than a predetermined period representative of the time delay of significant ones of non-direct transmission paths." This is the function explicitly recited in the claim. *See Micro Chem.*, 194 F.3d at 1258. Buffalo says it agrees with CSIRO's statement of the function but proposes the construction "separating an input data channel into a plurality of subchannels" merely to word the function in plain language. Regardless, CSIRO's construction captures the explicit recitation and therefore is correct.

Buffalo argues that this is irrelevant because the patent does not disclose any structure corresponding to claimed function—*i.e.*, that neither "the specification [nor] the prosecution history clearly link[] or associate[] that structure to the function recited in the claim." *Medtronic*, 248 F.3d at 1311. Buffalo contends that what CSIRO points to as corresponding structure—the Inverse Fast Fourier Transform ("IFFT") depicted in block 47 of Figure 7 and described in the text at columns 6:47-49, 8:2-8, 8:22-26, 8:37-50, 9:42-46, and 10:58-67—is nothing but a mathematical algorithm.

Absent some structure identified for performing the algorithm, Buffalo argues, the algorithm itself cannot be structure under controlling Federal Circuit precedent and, therefore, the claims containing the term are invalid on grounds of indefiniteness.

The Court does not need to address this argument, because it identifies the corresponding structure as "the Complex FFT (Fast Fourier Transform) Based Modulator in block 32 of Figure 6, executing the 16 Point Complex IFFT (Inverse Fast Fourier Transform) of block 47 of Figure 7, as referenced at column 6:23-31." Identification of a "modulator" is a sufficiently precise definition of a structure. Identification of a modulator as one based on an IFFT is required because the claim language states that the input data is modulated into a plurality of sub-channels. One of ordinary skill in the art would deem these descriptions to be adequate disclosures of structure for performing the specified function. Prior to CSIRO's reliance on only the IFFT block 47, Buffalo considered the corresponding structure to be the modulator of block 32.[3] Though, as Buffalo argues, no rule precludes a party from modifying claim construction positions prior to submission of the Joint Claim Construction and Hearing Statement, the fact that Buffalo considered the block 32 modulator as structure weighs in favor of the Court's finding.

"Demodulation means for demodulating received symbols of said plurality of sub-channels into output data for said output data channel"

The parties agree that the Court should construe this term as a means-plus-function limitation under 35 U.S.C. § 112, ¶ 6. The Court again agrees with CSIRO's identification of the function as "demodulating received symbols of said plurality of sub-channels into output data for said output data channel" because this exact recitation adheres to the *Micro Chemical* standard.

[3] *See* CSIRO Opening Brief at 47 (Docket No. 58).

The process that this term describes is the reverse of the process described by the term "modulation means . . . ." '069 Patent, cols. 6:54-56, 7:1-4. The parties' arguments regarding the corresponding structure for "demodulation means . . ." generally track the parties' arguments surrounding the term "modulation means . . . ." Based on the reasoning supporting the Court's identification of structure with respect to "modulation means," the corresponding structure for "demodulation means . . ." is "the FFT-based Complex Differential Demodulator in block 33 of Figure 6, executing the 16 Point FFT (Fast Fourier Transform) of block 63 of Figure 8."

"Ensemble demodulation means for demodulating received symbols of said plurality of sub-channels into data for said output data channel"

The parties agree that the Court should construe this term as a means-plus-function limitation under 35 U.S.C. § 112, ¶ 6. Moreover, the parties agree that this term depicts the same means-plus-function element as the term "demodulation means . . ." depicts and therefore the terms should be construed identically. The Court agrees and construes "ensemble demodulation means . . ." identically to "demodulation means . . . ."

"Means to apply data reliability enhancement"

The parties agree that the Court should construe this term as a means-plus-function limitation under 35 U.S.C. § 112, ¶ 6 and that the claimed function is "to apply a data reliability enhancement to said data passed to said modulation means." The Court agrees.

CSIRO contends that the corresponding structure for carrying out this claimed function is described in the specification as "(1) Forward Error Correction (FEC), or (2) Automatic Repeat Request (ARQ)," as referenced at columns 6:32-41, 9:66-10:2, 9:36-42, 8:9-16, 8:27-37, and 8:51-64. Buffalo contends, however, that the specification describes no structure corresponding to the

recited function. Specifically, Buffalo argues FEC and ARQ are functions carried out by algorithms or otherwise and that the patent's language reflects this by referring to forward error correction and automatic repeat request as only as "techniques or schemes," never as structure. *See*, *e.g.*, '069 Patent, cols. 8:27-28, 9:37-38. Buffalo likewise argues that the patent's relevant drawings—Figures 5 and 6—also disclose no corresponding structure. Rather, Buffalo contends they are simply "black boxes indicating the function to be performed but not the structure to perform it." However, the specification identifies the device capable of performing forward error correction in block 42 of Figure 7—a Rate ½ TCM (trellis coded modulation) Encoder. *See id.* at col. 6:32-46; Fig. 7, block 42. The term "encoder" is recognized by those skilled in the art as being a type of circuit structure. The Court is satisfied, therefore, that one of ordinary skill in the art would deem these descriptions to be adequate disclosures of structure corresponding to the claimed function.

Accordingly, the Court identifies the corresponding structure as "the Rate ½ TCM (trellis coded modulation) Encoder described in block 42 of Figure 7 and referenced at column 6:32-46."

"Means . . . for interleaving blocks of said data"

The parties agree that the Court should construe this term as a means-plus-function limitation under 35 U.S.C. § 112, ¶ 6 and that the claimed function is "interleaving blocks of data."

CSIRO contends that the corresponding structure is "link data interleaving whereby the encoded data is distributed between the carriers within the ensemble," and references as an example block 43 in Figure 7. *See* '069 Patent, cols. 8:17-21, 10:14-34. Once again, however, Buffalo contends that the specification describes no corresponding structure. Similar to its argument regarding FEC and ARQ, Buffalo argues that the patent refers to "link data interleaving" merely as

a technique or scheme, *see* cols. 8:17, 10:14-15, 10:18-19, and that the Figure 7, block 43 "Di-Bit Interleaver" identifies the function of interleaving two bits at a time but does not show any structure.

Interleaving, like FFT, IFFT, FEC and ARQ, is a technique familiar to one of skill in the art. One of skill in the art would recognize an "interleaver" as being a type of circuit structure that performs the technique. The patent need not disclose specific circuitry when describing structure adequately linked to the function; "interleaver" suffices. *See S3*, *Inc. v. NVIDIA Corp.*, 259 F.3d 1364, 1370-71 (Fed. Cir. 2001).

Therefore, the corresponding structure for carrying out the claimed function is "the Di-Bit Interleaver described in block 43 of Figure 7." One of ordinary skill in the art would deem this description to be an adequate disclosure of structure corresponding to the claimed function.

CONCLUSION

For the foregoing reasons, the Court interprets the claim language in this case in the manner set forth above. For ease of reference, the Court's claim interpretations are set forth in a table as Appendix B. The claims with the disputed terms in bold are set forth in Appendix A.

So ORDERED and SIGNED this 8th day of May, 2006.

LEONARD DAVIS
UNITED STATES DISTRICT JUDGE

APPENDIX A

CLAIMS OF U.S. PATENT NO. 5,487,069 CONTAINING DISPUTED TERMS

10. A wireless LAN comprising:

a plurality of hub transceivers coupled together to constitute a plurality of data sources and destinations; and

a plurality of mobile transceivers each coupled to data processing means and between each said data processing means and a corresponding said transceiver data passes to be transmitted or received, said transceivers being for data transceiving operation by radio transmissions to one of said hub receivers in a **confined multipath environment**, and each transceiver comprising: **antenna means** coupled to transmission signal processing means and to reception signal processing means, said transmission signal processing means in turn coupled to a [*sic*] output data channel, each said transceiver being operable to transmit and receive data at **radio frequencies**, said transmission signal processing means comprising **modulation means for modulating input dada of said input data channel into a plurality of sub-channels comprised of a sequence of data symbols such that the period of a sub-channel symbol is longer than a predetermined period representative of the time delay of significant ones of non-direct transmission paths**, **means to apply a data reliability enhancement** to said data passed to said modulation means and **means**, interposed between said data reliability enhancement means and said **ensemble modulation means**, **for interleaving blocks of said data**.

15. A wireless LAN as claimed in claim 10, wherein said reception signal processing means comprises **demodulation means for demodulating received symbols of said plurality of sub-channels into output data for said output data channel**

16. A wireless LAN as claimed in claim 10, further comprising switching means for selectively coupling said antenna means to said transmission signal processing means for transmission of data and to said reception signal processing means for reception of data.

26. A peer-to-peer wireless LAN comprising :

a plurality of mobile transceivers for data transceiving operation by radio transmissions between ones thereof in a **confined multipath environment**, each said transceiver being coupled to a data processing means, and between each said data processing means and a corresponding said transceiver data passes to be transmitted or received, each said transceiver comprising: **antenna means** coupled to transmission signal processing means and to reception signal processing means, said transmission signal processing means in turn coupled to an input data channel, and said reception signal processing means in turn coupled to an output data channel, each said transceiver being operable to transmit and receive data at **radio frequencies**, said transmission signal processing means comprising **modulation means for modulating input data of said input data channel into a plurality of sub-channels comprised of a sequence of data symbols such that the period of a sub-channel symbol is longer than a predetermined period representative of the time delay of significant ones of non-direct transmission paths**, **means to apply data reliability enhancement** to said data passed to said ensemble modulation means and **means**, interposed between said

data reliability enhancement means and said **ensemble modulation means**, **for interleaving blocks of said data**.

31. A peer-to-peer wireless LAN as claimed in claim 26, wherein said reception signal processing means comprises **demodulation means for demodulating received symbols of said plurality of sub-channels into output data for said output data channel**.

32. A peer-to-peer wireless LAN as claimed in claim 26, further comprising switching means for selectively coupling said **antenna means** to said transmission signal processing means for transmission of data and to said reception signal processing means for reception to data.

40. A transceiver as claimed in 33, wherein said reception signal processing means comprises **demodulation means for demodulating received symbols of said plurality of sub-channels into output data for said output data channel**.

42. A transceiver for operation in a **confined multipath transmission environment**, said transceiver comprising **antenna means** coupled to transmission signal processing means and to reception signal processing means, said transmission signal processing means in turn coupled to an input data channel, and said reception signal processing means in turn coupled to an output data channel, said transceiver being operable to transmit and receive data at **radio frequencies**, said transmission signal processing means comprising **modulation means for modulating input data of said input data channel into a plurality of sub-channels comprised of a sequence of data symbols such that the period of a sub-channel symbol is longer than a predetermined period representative of the time delay of significant ones of non-direct transmission paths**, **means to apply data reliability enhancement** to said data passed to said modulation means and **means**, interposed between said data reliability enhancement means and said modulation means, **for interleaving blocks of said data**.

47. A transceiver as claimed in 42, wherein said reception signal processing means comprises **ensemble demodulation means for demodulating received symbols of said plurality of subchannels into said output data channel**.

48. A transceiver as claimed in claim 42, further comprising switching means for selectively coupling said **antenna means** to said transmission signal processing means for transmission of data and to said reception signal processing means of reception of data.

56. A transmitter for operation in a **confined multipath transmission environment**, said transmitter comprising **antenna means** coupled to transmission signal processing means in turn coupled to an input data channel, said transmitter being operable to transmit data at **radio frequencies**, said transmission signal processing means comprising **modulation means for modulating input data of said input data channel into a plurality of sub-channels comprised of a sequence of data symbols such that the period of a sub-channel symbol is longer than a predetermined period representative of the time delay of significant ones of non-direct transmission paths**, **means to apply data reliability enhancement** to said data passed to said modulation means and **means**, interposed between said data reliability enhancement means and said modulation means, **for interleaving blocks of said data**.

68. A method for transmitting data in a **confined multipath transmission environment** of **radio frequencies**, said data being provided by an input data channel coupled to transmission signal processing means in turn coupled to **antenna means**, said method comprising the steps of:

applying data reliability enhancement to said data;

interleaving blocks of said enhanced data;

modulating said data, by **modulation means of said transmission signal processing means, into a plurality of sub-channels comprised of a sequence of data symbols such that the period of a sub-channel symbol is longer than a predetermined period representative of significant ones of non-direct transmission paths**; and

transmitting, by said antenna means, said sub-channel signals.

APPENDIX B

CLAIMS CONSTRUCTIONS FOR U.S. PATENT NO. 5,487,069

Disputed Claim Term	Court's Construction
"confined multipath [transmission] environment" Claims 10, 26, 42, 56, 58	An indoor environment.
"transmission signal processing means" Claims 10, 16, 26, 32, 42, 48, 56, 68	**[AGREED]** Transmission signal processing means is comprised of modulation means for modulating input data of said input data channel into a plurality of sub-channels comprised of a sequence of data symbols such that the period of a sub-channel symbol is longer than a predetermined period representative of the time delay of significant ones of non-direct transmission paths, means to apply data reliability enhancement to said data passed to said modulation means and means, interposed between said data reliability enhancement means and said modulation means, for interleaving blocks of said data. This definition applies only to the asserted claims.
"reception signal processing means" Claims 10, 15, 16, 26, 31, 32, 42, 47	**[AGREED]** Means to modify received signals by performing essentially the reverse procedures of those in the corresponding elements in the transmission signal processing means.
"radio frequencies" Claims 10, 26, 42, 56, 68	The frequencies in the portion of the electromagnetic spectrum that is between the audio-frequency portion and the infrared portion.
"antenna means" Claims 10, 26, 32, 42, 48, 56, 68	A means for radiating or receiving radio waves.

"forward error correction" Claims 11, 27, 43, 57, 69	**[AGREED]** Means of error control for data transmission wherein the receiving device has the capability to detect and correct signals received in error using any forward error correction scheme such as, but not limited to Reed-Solomon, convolutional coding or trellis coding.
"applying data reliability enhancement" Claim 68	**[AGREED]** The utilization of techniques to enhance the reliability of the data received by the receiver, such as automatic repeat request (ARQ) and forward error correction (FEC)**.**
"modulation means for modulating input data of said input data channel into a plurality of sub-channels comprised of a sequence of data symbols such that the period of a sub-channel symbol is longer than a predetermined period representative of the time delay of significant ones of non-direct transmission paths" Claims 10, 26, 42, 56, 68	"Modulation means . . ." is a means-plus function element under 35 U.S.C. § 112, ¶ 6. The claimed function is "modulating input data of said input data channel into a plurality of sub-channels comprised of a sequence of data symbols such that the period of a sub-channel symbol is longer than a predetermined period representative of the time delay of significant ones of non-direct transmission paths." The corresponding structure for the claimed function is "the Complex FFT (Fast Fourier Transform) Based Modulator in block 32 of Figure 6, executing the 16 Point Complex IFFT (Inverse Fast Fourier Transform) of block 47 of Figure 7, as referenced at column 6:23-31."
"ensemble modulation means" Claims 10, 26, 47	**[AGREED]** "Ensemble modulation means" is the same as "modulation means for modulating a plurality of sub-channels," as defined above.

"demodulation means for demodulating received symbols of said plurality of sub-channels into output data for said output data channel" Claims 15, 31, 40, 47	"Demodulation means . . ." is a means-plus-function element under 35 U.S.C. § 112, ¶ 6. The claimed function is "demodulating received symbols of said plurality of sub-channels into output data for said output data channel." The corresponding structure for carrying out the claimed function is "the FFT-based Complex Differential Demodulator in block 33 of Figure 6, executing the 16 Point FFT (Fast Fourier Transform) of block 63 of Figure 8."
"ensemble demodulation means for demodulating received symbols of said plurality of sub-channels into data for said output data channel" Claim 47	"Ensemble demodulation means . . ." is a means-plus-function element under 35 U.S.C. § 112, ¶ 6. The claimed function is "demodulating received symbols of said plurality of sub-channels into output data for said output data channel." The corresponding structure for carrying out the claimed function is "the FFT-based Complex Differential Demodulator in block 33 of Figure 6, executing the 16 Point FFT (Fast Fourier Transform) of block 63 of Figure 8."
"means to apply a data reliability enhancement" Claims 10, 26, 42, 56	"Means to apply a data reliability enhancement" is a means-plus-function element of 35 U.S.C. § 112, ¶ 6. The claimed function is "to apply a data reliability enhancement to said data passed to said modulation means." The corresponding structure for carrying out the claimed function is "the Rate ½ TCM (trellis coded modulation) Encoder described in block 42 of Figure 7 and referenced at column 6:32-46."

"means . . . for interleaving blocks of said data" Claims 10, 26, 42, 56	"Means . . . for interleaving blocks of said data" is a means-plus-function element under 35 U.S.C. § 112, ¶ 6. The claimed function is "interleaving blocks of data." The corresponding structure for carrying out the claimed function is "the Di-Bit Interleaver described in block 43 of Figure 7."
"data processing means" Claims 10, 26	**[AGREED]** A means to process electronic signals.
"coupled [coupling]" Claims 10, 26, 32, 42, 46, 48, 56, 68	**[AGREED]** Connected [connection] directly or indirectly.